tains extracts from numerous workers, and, owing to the limited time available, the portion relating to the internal anatomy has been taken entirely from Stephens and Christophers's work on malaria, &c. The bionomics and natural enemies are next considered, and prove extremely interesting and instructive, much original work having been performed, especially in connection with the former subject. A few pages on technique follow, and we then reach the part dealing with the relation of mosquitoes to man. This, of necessity a somewhat lengthy contribution, covers some 130 pages, and deals successively with the carrying of disease by mosquitoes in general, malaria, yellow fever, dengue, filariasis, suggested relations with other diseases, and the effect of mosquito bites.

Under malaria an account is given of the organisms concerned in its production, and of the demonstration of its carriage; thirty-three species of Anopheles, some of doubtful validity, being cited as transmitters. The general biology of the Anopheline mosquitoes is also satisfactorily dealt with, and the section concludes with reference to the distribution, appearance, and disappearance of the disease. Yellow fever is treated on similar lines, the bionomics of the mosquito, under the name of *Aëdes calopus,* being considered in great detail. As regards filariasis, fourteen species are enumerated, and have apparently been directly incriminated as transmitting agents.

More than one hundred pages are devoted to the consideration of economic loss from mosquitoes, the subject being discussed in relation to disease, real estate, and agriculture. Under this section, too, we find references to the flight and transportation of these flies, and lastly an exhaustive treatise on protective and remedial work in connection with mosquitoes generally. The volume concludes with numerous examples of mosquito control and an extensive bibliography.

Vol. ii. is devoted exclusively to plates. These deal with the structure of the male genital organs of a large number of species, the wings of certain Anophelines, and the earlier stages in the life-cycle. Illustrations are given of numerous species of larvæ, including no fewer than fifty-nine plates relating to their detailed structure. Many of the plates are beautifully executed, and the authors are to be congratulated upon the production of this volume, which points out very clearly the large amount of original work performed.

The work will undoubtedly prove a most valuable addition to the literature of the subject, and will be heartily welcomed by all who are interested in these noxious insects.

TWO FRENCH MATHEMATICAL BOOKS.

(1) *Notions de Mathématiques.* By Prof. A. Sainte-Laguë. Avec Préface de Prof. G. Kœnigs. Pp. vii+512. (Paris: A. Hermann et Fils, 1913.) Price 7 francs.

(2) *Propriétés Cinématiques Fondamentales des Vibrations.* By M. Guillet. Notes de Dr. M. M. Aubert. Pp. 405. (Paris: Gauthier-Villars, 1913.) Price 16 francs.

(1) THE development of mathematical teaching in this country has been greatly influenced during the last decade by foreign methods. For this, if for no other reason, English teachers will do wisely to watch the evolution of these methods, and this can most easily be done by studying the tendencies of recent text-books.

M. Sainte-Laguë's work on the elements of mathematics is one which will repay such study. Unlike the majority of school-books dealing with this subject, it is not intended for the beginner, but aims at giving a condensed account of results and processes essential to those who have to use mathematics in simple practical applications.

The book is divided into four parts, devoted respectively to arithmetic, algebra, trigonometry, and geometry. Those principles which are continually used in practical applications are kept to the front, and exercises which merely require skill in manipulation are generally excluded. Thus the algebra contains no reference to permutations and combinations, and the binomial and exponential theorems are left to a more advanced stage. On the other hand, the use of logarithms and of the slide rule is explained, and the section on arithmetic contains a valuable chapter on errors and approximate calculations.

It is remarkable that, although the derived function is used and defined, no use is made of the classical notation of the differential and integral calculus. In the section on trigonometry the discussion of the inscribed and circumscribed circles is omitted, and the solution of triangles is compressed into a very few pages. One or two results of spherical trigonometry are included.

The book works throughout in *grades,* instead of degrees; to the English reader this will certainly prove a stumbling-block. The grade has never won recognition outside France, and has not displaced the degree for astronomical purposes.

The section on geometry is the longest in the book. Space geometry is introduced very early. The method of superposition is employed throughout, and the theory of parallels is based on the notion of the motion of translation of a rigid body. Although, according to the best authorities, this may be faulty from the logical point of view, it

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is probably psychologically sound. There are also chapters on graphical constructions, on plan and elevation, and on contour lines. The work concludes with a section on kinematics. A good set of graduated examples, together with numerical tables and formulæ, will be found at the end.

(2) M. Guillet's book on vibrations is of the nature of a monograph in which the mathematics of "small oscillations" have been collected and classified, with numerous illustrations taken from the theories of light, sound, and electromagnetism.

The whole is a reprint from notes taken by Dr. M. M. Aubert of lectures given in the University of Paris by the author. The first part of the book deals with the theory of simple harmonic motion, free and damped. Several chapters are devoted to the composition of such motions, of plane and elliptically-polarised vibrations, and to phenomena of interference. A number of examples of the calculation of differences of path are given, having special reference to well-known problems of diffraction.

The second part deals with the propagation of waves in elastic solids and fluids. The author establishes the equations of equilibrium and small motion of an elastic solid, and deduces solutions of the problems of flexure and torsion in the simplest cases. He considers the propagation of dilatational and distortional waves in elastic media, and also the vibrations of rods and wires.

The book concludes with a consideration of the elastic-solid theory of the luminiferous æther, the elastic constants being adjusted to give Lord Kelvin's well-known "contractile" æther; certain vectors found are then interpreted in terms of the electromagnetic theory.

A work of this nature, which touches upon a number of different theories, is always liable to fall into the defect of "scrappiness," and it cannot be said that the present volume altogether escapes this reproach; it is, however, both instructive and stimulating, and contains a great deal of valuable information—information which is usually widely scattered, and therefore largely unavailable for the learner. In this sense the book supplies a distinct want. L. N. G. F.

OUR BOOKSHELF.

Abhandlungen und Vorträge zur Geschichte der Naturwissenschaften. By Prof. E. O. von Lippmann. Zweiter Band. Pp. x+491. (Leipzig: Veit and Co., 1913.) Price 8 marks.

PROF. VON LIPPMANN presents in this volume a second collection of the valuable historical studies which he has contributed to *Chemiker-Zeitung* and other periodicals. The articles are thirty-six in number, and, like those published in the former volume, range over the whole history of chemistry. They exhibit the author as a man of wonderfully wide learning and remarkable security of scholarship.

The studies are divided into eight sections upon a chronological basis. The first section contains an analysis, from the point of view of chemical knowledge, of the famous medical papyrus, of the sixteenth centry B.C., discovered by Ebers at Luxor. A second article, on the term "caput mortuum" (=iron oxide), throws interesting light upon the mystical interpretations of chemical phenomena which originated, like the "black art" itself, in Egypt. The second section deals with Greek and Hellenistic chemistry. Here, as is fitting, Plato and Aristotle have the pride of place, the great achievements of Aristotle receiving particularly careful attention. A short note upon Archimedes's method of determining specific gravity leaves the "eureka" story unassailed in principle, but proves that the "crown" of Hiero was really a golden wreath. On the other hand, the author robs that early precursor of Mme. Curie, the alchemist Maria (possibly of the first century A.D.), of the credit of inventing the water-bath ("balneum Mariæ") and Papin of his "digester," showing that the former was known before Aristotle and the latter in the third century A.D. These two destructive articles illustrate very well Prof. von Lippmann's encyclopædic knowledge of the literature of his subject. Among the most interesting of the later articles are those on the chemical names used by Marco Polo, on J. J. Becher's observations anticipatory of Mendel and De Vries, on Jean Rey, on the word "gas," which van Helmont is declared to have adopted from the "chaos" of Paracelsus, and on E. C. Howard, the inventor of the vacuum apparatus for sugar-refining. But the author has touched no subject which he has not adorned.

Mineral and Aërated Waters. By C. Ainsworth Mitchell. Pp. xiii+227. (London: Constable and Co., Ltd., 1913.) Price 8*s*. 6*d*. net.

THE author takes us back to the beginnings of the mineral-water industry by interesting descriptions of natural mineral springs, spas, and holy wells; for it was from the first attempts to copy the actual or supposed healing virtues of such waters that the extensive manufacture of mineral waters began, developed, and expanded into the great industry of to-day. The analyses of the more famous natural waters are given in the first part of the volume, devoted to the history of the subject, and perhaps the most striking feature of this history is the changed aspect of current belief in the efficacy of such waters by the known presence of radio-active substances contained in some of them. The chemical constituents being accurately known, a natural water can be produced in the laboratory, but, as is frequently asserted, without the therapeutic action of the natural product. The author states, however, that "recently bottles of special construction, containing artificial radio-active mineral waters, have been put upon the market in Sweden."

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